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(71) Applicant (for all designated States except US): BAE SYSTEMS INFORMATION AND ELECTRONIC SYSTEMS INTEGRATION INC. [US/US]; 65 Spit Brook Road, NHQ01-719, Nashua, NH 03061 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): GRASSO, Robert, J. [US/US]; 28 Mulberry Lane, Boxford, MA 01921 (US).

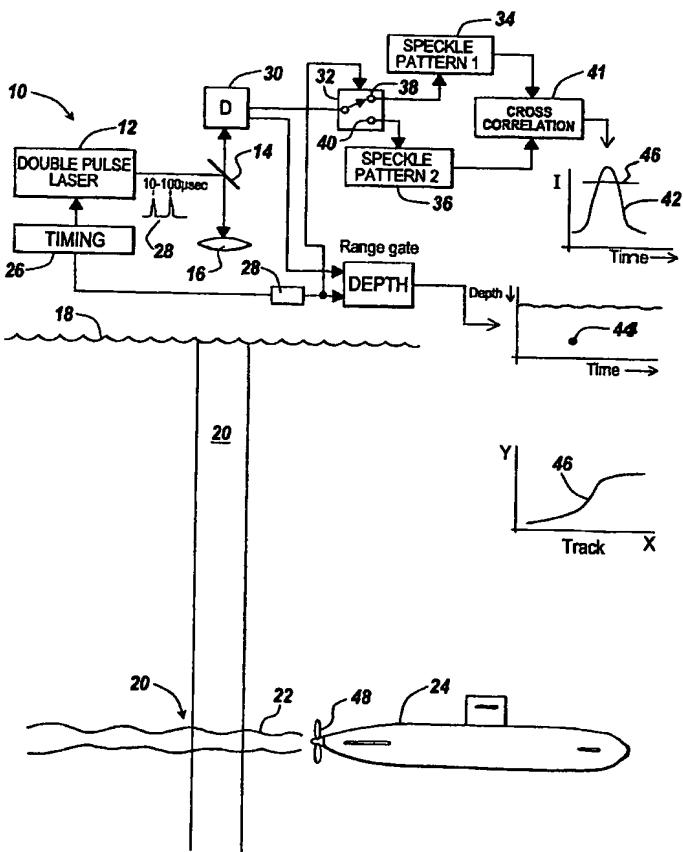
(74) Agent: LONG, Daniel, J.; Bae Systems Information and Electronic Systems Integration Inc., 65 Spit Brook Road, NHQ01-719, Nashua, NH 03061 (US).

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[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR DETECTING SUBMARINES



(57) Abstract: A method for detecting, tracking and locating submarines (24) utilizes pulsed coherent radiation from a laser (12) that is projected down through a water column, with particles in the water producing speckle from backscatter of the random particle distribution, with correlation of two closely time-spaced particle-based speckle patterns providing an intensity measurement indicative of the presence of a submarine. Subsurface submarine movement provides a subsurface wake which causes movement of particles such that two closely-spaced "snapshots" of the returns from particles in the same water column can detect particle movement due to the wake. The magnitude of the speckle pattern change indicates particle movement. In one embodiment, the return signals are imaged onto an intensified CCD or APA array that capture two successive laser pulses through the utilization of dual pixel registered cameras. Note that in the subject system, phase information is converted to measurable intensity information relating to particle motion.



GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4717252 A (HALLDORSSON ET AL.) 05 JANUARY 1988 (05.01.1988) SEE ABSTRACT.	1-23
A	US 4893924 A (LEONARD ET AL.) 16 JANUARY 1990 (16.01.1990), SEE ABSTRACT.	1-23
A	US 20030127558 A1 (HEIZMANN-BARTELS) 10 JULY 2003 (10.07.2003), SEE ABSTRACT.	1-23

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

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"B"	earlier application or patent published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
Facsimile No. (703) 305-3230

Authorized officer

Daniel Pihulic

Telephone No. 703-308-1113